

REMARKS

The Examiner is thanked for carefully reviewing the present application. The present amendment is in response to the Office Action mailed on August 23, 2005 regarding claims 1-9, 41-44 and 46-50. The applicants have thoroughly reviewed the outstanding Office Action including the Examiner's remarks and the references cited therein. The following remarks are believed to be fully responsive to the Office Action and render all claims at issue patentably distinguishable over cited references.

Favorable reconsideration is requested in view of the following remarks.

Claims 1 and 41 are amended, and therefore claims 1-9, 41-44 and 46-50 are now pending in the application. These amendments contain no new matter nor raise new issues.

Claim Rejections under 35 U.S.C. §103(a)

1. Claims 1-9 are rejected under 35 U.S.C.103(a) as being unpatentable over Ito et al. (US 6,583,442) (hereinafter referred to as "Ito et al.") in combination with Shima et al. (US 4,532,631) (hereinafter referred to as "Shima et al.") and Sugimoto et al. (JP 04061184) (hereinafter referred to as "Sugimoto et al."). These rejections are respectfully traversed. As will be fully explained below, it is respectfully submitted that Ito et al. in combination with Shima et al. and Sugimoto et al. do not render the claimed invention obvious, and the applicants respectfully request that the section 103(a) rejection be withdrawn.

(1) With regard to the amended claim 1, the applicants claim a light emitting diode (LED), comprising: a semiconductor layer of a first polarity; an active layer, located on the semiconductor layer of the first polarity; and a semiconductor layer of a second polarity, located on the active layer, wherein at least one side of a stacked structure at least composed of the active layer and the semiconductor layer of the second polarity has a wave-shape border in a top view of the LED, thereby reducing the probability of reflecting the light emitted from the active layer, thus making light emitted from the active layer penetrate through the at least one side and be emitted outside the LED, wherein the wave-shape border is formed from an etched surface, and the etched surface is formed by employing one single mask.

Ito et al. disclose a light emitter device, comprising a semiconductor layer 102 of a first polarity; an active layer 103, located on the semiconductor layer of the first polarity; and a semiconductor layer 104 of a second polarity, located on the active layer. However, it is apparent that Ito et al. fail to teach that at least one side of a stacked structure at least composed of the active layer and the semiconductor layer of the second polarity has a wave-shape border in a top view of the LED.

Shima et al. disclose a laser in which a side of the active layer 6 has a wave shape border in a top view. However, in Shima et al., the wave shape border of the active layer 6 is just the border of the structure of the active layer 6, not the border of the stacked structure composed the active layer 6 and the overlaying P-type clad layer 7 (see figs. 1 and 2 and associated text in Shima et al.). Furthermore, the active layer 6 is grown by a liquid-phase epitaxial process, and the surface configuration of the sides 13 and 14 of the active layer 6 is influenced by the surface configuration of the sides of the groove 20, so it is clear that the wave shape border of the active layer 6 is formed from an epitaxial surface and not an etched surface (col. 3, lines 35-47 in Shima et al.). Moreover, since the surface of the side of the active layer 6 is not an etched surface, the epitaxial surface of the active layer 6 is not formed by employing one single mask.

According to the aforementioned description, neither Ito et al. nor Shima et al. teach the technique features recited in the amended claim 1 of the present application, which include at least one side of a stacked structure at least composed of the active layer and the semiconductor layer of the second polarity having a wave-shape border in a top view of the LED; and the wave-shape border being formed from an etched surface formed by employing one single mask. In addition, the desired surface structure of the at least one side of the stacked structure can be easily formed by applying one single mask and an etching step in the amended claim 1, and the surface structure of the at least one side of the stacked structure can be easily modified by modifying or changing the mask, but the surface structure of the edge of the active layer 6 in Shima et al. is entirely influenced by the surface configuration of the sides of the groove 20 and cannot easily modified.

Therefore, Ito et al. do not teach the technique features recited in the amended claim 1 of the present application, and Shima et al. do not disclose the technique features of the claimed invention, either. Furthermore, Shima et al. cannot cure the insufficiency of Ito et al.. In view of the foregoing, the recited features of amended claim 1 are non-obvious, and the amended claim 1 is allowable.

(2) With regard to claims 2-9, since the independent claim 1 is allowable, dependent claims 2-9 each of which depends from independent claim 1 are likewise believed to be allowable. Accordingly, the applicants respectfully request that the section 103(a) rejections be withdrawn.

2. Claims 41-44 and 46-50 are rejected under 35 U.S.C.103(a) as being unpatentable over Ito et al. (US 6,583,442) (hereinafter referred to as "Ito et al.") in combination with Shima et al. (US 4,532,631) (hereinafter referred to as "Shima et al.") and Sugimoto et al. (JP 04061184) (hereinafter referred to as "Sugimoto et al."). These rejections are respectfully traversed. As will be fully explained below, it is respectfully submitted that Ito et al. in combination with Shima et al. and Sugimoto et al. do not render the claimed invention obvious, and the applicants respectfully request that the section 103(a) rejection be withdrawn.

(1) With regard to the amended claim 41, the applicants disclose a light emitting diode (LED), comprising: a semiconductor layer of a first polarity; an active layer, located on the semiconductor layer of the first polarity; and a semiconductor layer of a second polarity, located on the active layer, wherein at least one side of a stacked structure at least composed of the active layer and the semiconductor layer of the second polarity has an uneven surface, thereby reducing the probability of reflecting the light emitted from the active layer, thus making light emitted from the active layer penetrate through the at least one side and be emitted outside the LED, wherein the uneven surface of the stacked structure is an etched surface formed by employing one single mask.

Ito et al. disclose a light emitter device, comprising a semiconductor layer 102 of a first polarity; an active layer 103, located on the semiconductor layer of the first polarity; and a semiconductor layer 104 of a second polarity, located on the active layer. However, it is apparent that Ito et al. fail to teach that at least one side of a stacked structure at least composed of the active layer and the semiconductor layer of the second polarity has an uneven surface.

Besides, Shima et al. disclose a laser in which a side of the active layer 6 has an uneven surface. However, in Shima et al., the uneven surface only belongs to the structure of the active layer 6, and the P-type clad layer 7 overlaying the active layer 6 has another surface excluding the uneven surface of the active layer 6 (see figs. 1 and 2 and associated text in Shima et al.). Furthermore, the active layer 6 is grown by a liquid-phase epitaxial process, and the uneven surfaces of the sides 13 and 14 of the active

layer 6 are influenced by the surface configuration of the sides of the groove 20, so it is clear that the surfaces of the sides of the active layer 6 are epitaxial surfaces and are not etched surfaces (col. 3, lines 35-47 in Shima et al.). Moreover, since the surfaces of the sides of the active layer 6 are not etched surfaces, the surfaces of the sides of the active layer 6 are not formed by employing one single mask.

According to the aforementioned description, Ito et al. and Shima et al. do not teach the technique features recited in the amended claim 41 of the present application, which include at least one side of a stacked structure at least composed of the active layer and the semiconductor layer of the second polarity having an uneven surface; and a side surface of the at least one side of the stacked structure being an etched surface formed by employing one single mask. Moreover, the desired surface structure of the at least one side of the stacked structure can be easily formed by applying one single mask and an etching step in the amended claim 41, and the surface structure of the at least one side of the stacked structure can be easily modified by modifying or changing the mask, but the surface structure of the edge of the active layer 6 in Shima et al. is entirely influenced by the surface configuration of the sides of the groove 20 and cannot easily modified.

Accordingly, neither Ito et al. nor Shima et al. teach the technique features recited in the amended claim 41 of the present application. Furthermore, Shima et al. cannot cure the insufficiency of Ito et al., either. Obviously, the technology features of the amended claim 41 are non-obvious, and the amended claim 41 is allowable.

(2) With regard to claims 42-44 and 46-50, since the independent claim 41 is allowable, dependent claims 42-44 and 46-50 each of which depends from independent claim 41 are likewise believed to be allowable. Accordingly, the applicants respectfully request that the section 103(a) rejections be withdrawn.

CONCLUSION

In light of the above remarks, Applicants respectfully submit that Claims 1-9, 41-44 and 46-50 as currently presented are in condition for allowance and hereby request reconsideration. Applicants respectfully request the Examiner to pass the case to issue at the earliest convenience.

Respectfully submitted,

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